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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/919,643	07/31/2001	Diane D. Ilsley	10991398-1	5729

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Agilent Technologies, Inc.  
Legal Department, DL429  
Intellectual Property Administration  
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EXAMINER
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LIU, SUE XU

ART UNIT	PAPER NUMBER
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1639

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/27/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/919,643	ILSLEY ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Sue Liu	1639	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 27 November 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-10 and 12-35 is/are pending in the application.
- 4a) Of the above claim(s) 29-34 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-10,12-28 and 35 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/27/06 has been entered.

### ***Claim Status***

2. Claims 3 and 11 have been canceled as filed on 11/27/06.

Claim 35 has been added as filed on 11/27/06.

Claims 1-2, 4-10, and 12-35 are currently pending.

Claims 1 and 28 have been amended;

Claims 29-34 have been withdrawn as previously acknowledged;

Claims 1, 2, 4-10, 12-28, and 35 are being examined in this application.

### ***Claim Amendments***

3. The amendment and response filed on 11/27/06 have been fully considered and entered in the application.

***Claim Rejections Maintained***

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1, 2, 4, 6-10, 12, 13, 15-18, 20, 21, and 35 are rejected under **35 U.S.C. 102(a)** as anticipated by Caren et al (US 6,221,653; 04/24/2001; cited previously). The previous rejection over Claims 1, 2, and 9 is maintained and rewritten as below. Upon further consideration, Claims 4, 6-8, 10, 12, 13, 15-18, 20, and 21 are additionally rejected over Caren et al. The rejection over Claim 35 is necessitated by applicant's amendment to the claims.

The instant claims recites a method for depositing a quantity of a fluid containing a protein of interest onto a surface of a substrate, said method comprising: (a) front loading said quantity of fluid into a thermal inkjet head comprising an orifice and a firing chamber by contacting said orifice with said fluid in a manner so that said fluid flows through said orifice into said firing chamber, wherein said quantity of fluid is no more than about 5  $\mu$ l; (b) positioning said loaded thermal inkjet head in opposing relation to said surface; and (c) actuating said thermal inkjet head to deposit said quantity of fluid onto said surface.

Caren et al, throughout the patent, teach a method for depositing a quantity of fluid containing a plurality of binding agents onto a substrate surface (such as an array) (e.g. Claims 1 and 6 of the reference), which reads on the method of depositing fluid on a substrate of **clms 1, 12, 17, and 22**, as well as the planar substrate and reagent chamber of **clms 9, 10, 15, 16, 20, 21, 26, and 27**. The reference further claims the deposition is through a thermal inkjet (e.g. Claim 1) through a “positioning” and an “actuating” steps, which reads on the steps of **clms 1, 12, 17, and 22**. The reference also teaches loading fluid into the thermal inkjet head by allowing fluid flow through the orifice into said firing chamber (e.g. Claims 1 and 6), and applying back (negative) pressure to said head during the contacting step (e.g. Claim 7; col. 5, lines 52+), which read on the front loading step of **clms 1, 12, 17, and 22**, and back (negative) pressure of **clms 2, and 35**. The reference further teaches the deposit fluid comprises binding agents (a member of a specific binding pair) such as proteins and enzymes (e.g. Claim 3; Column 2, lines 28+; col. 4, lines 36+), which reads on the protein of **clms 1, 7, 8, 12, 17, 22, 24, and 25**.

The reference also teaches volumes of the firing chamber, for example, about 1 pl to 1.5 nl (col. 5, lines 6+), which reads on the no more than (or less than) about 5  $\mu$ l, and 2  $\mu$ l of **clms 1, 4, 12, 13, 17, 18, and 28**.

The reference teaches washing fluid deposited by the thermal inkjet head (col. 7, lines 45+), which reads on the inkjet head washing step of **clms 6, 12, 17, and 23**.

#### Discussion and Answer to Argument

6. Applicant's arguments have been fully considered but they are not persuasive for the following reasons (in addition to reasons of record). Each point of applicant's traversal is addressed below (applicant's arguments are in *italic*):

*Applicants argue that the amended claims (Claim 1) recites "no more than 5  $\mu$ l", which is not taught by the '653 patent.*

Applicants are respectively directed to the above rejection for the discussion of how the reference's teaching anticipates the claimed invention (including the no more than 5  $\mu$ l).

7. Claims 1, 2, 4, 6-10, 12, 13, 15-18, 20, 21, and 35 are rejected under **35 U.S.C. 102(e)** as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Caren et al (US 6,797,469 B2; 09/28/2004; filed 03/26/2001; cited previously). The previous rejection over Claims 1, 2, and 9 is maintained and rewritten as below. Upon further consideration, Claims 4, 6-8, 10, 12, 13, 15-18, 20, and 21 are additionally rejected over Caren et al. The rejection over Claim 35 is necessitated by applicant's amendment to the claims.

Caren et al, throughout the patent teach:

"A method for depositing a quantity of fluid containing a nucleic acid or polypeptide onto an array surface having a plurality of nucleic acids or polypeptides stably associated therewith, said method comprising: loading said fluid containing nucleic acid or polypeptide into a thermal inkjet head comprising an orifice and a firing chamber by contacting said orifice with said fluid in a manner sufficient for said fluid to flow through said orifice into said firing chamber; positioning said thermal inkjet head filled with said nucleic acid or polypeptide containing fluid in opposing relation to said substrate; and actuating said thermal inkjet head in a manner sufficient to expel a quantity of said fluid onto said substrate surface to deposit said quantity of fluid on said substrate surface." (e.g. Claim 19 of the reference). This teaching reads on the

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method of **clms 1, 12, 17 and 22**, and the planar substrate and reagent chamber of **clms 9, 10, 15, 16, 20, 21, 26, and 27**.

The reference also teaches applying back (negative) pressure to said head during the contacting step (e.g. Claim 20; col. 5, lines 60+), which read on the front loading step of **clms 1, 12, 17, and 22**, and back (negative) pressure of **clms 2, and 35**. The reference further teaches the deposit fluid comprises binding agents (a member of a specific binding pair) such as proteins and enzymes (e.g. Claim 19; Column 2, lines 31+; col. 4, lines 43+), which reads on the protein of **clms 1, 7, 8, 12, 17, 22, 24, and 25**.

The reference also teaches volumes of fluid, for example, about 0.1 pl to 2000 pl (Claim 23), which reads on the no more than (or less than) about 5  $\mu$ l, and 2  $\mu$ l of **clms 1, 4, 12, 13, 17, 18, and 28**.

The reference teaches washing fluid deposited by the thermal inkjet head (col. 7, lines 55+), which reads on the inkjet head washing step of **clms 6, 12, 17, and 23**.

#### Discussion and Answer to Argument

8. Applicant's arguments have been fully considered but they are not persuasive for the following reasons (in addition to reasons of record). Each point of applicant's traversal is addressed below (applicant's arguments are in italic):

*Applicants argue that the amended claims (Claim 1) recites "no more than 5  $\mu$ l", which is not taught by the '469 patent.*

Applicants are respectively directed to the above rejection for the discussion of how the reference's teaching anticipates the claimed invention (including the no more than 5  $\mu$ l).

*Claim Rejections - 35 USC § 103*

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

(Note: the instant claim numbers are in bold font.)

10. Claims 1, 2, 4-10, 12-28, and 35 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Deeg et al (US 5,338,688; 08/16/1994; cited previously). The previous rejection over Claims 1, 2, 4-10, 12-28 is maintained and rewritten as below. The rejection over Claim 35 is necessitated by applicant's amendment to the claims.

Deeg et al, throughout the patent, teach a method generating of a biochemical analytical liquid to a target (See Abstract of the reference). The reference teaches ejecting biochemical analytical liquid from a jet chamber (See Claim 1 of the reference), and an inkjet printing head with an ink reservoir (reads on firing chamber of **clms 1, 12, 17, 22**) was used (See Column 6, lines 58-68 of the reference). Since thermal inkjet would utilize pressure to eject fluid onto substrate and aspiration of reagent solution (e.g. See Example 4, step e)), these read on "applying back pressure to said head" of **clm 2**. These also read on a thermal inkjet head comprising an orifice (See Figure 1 of the reference, for example) and a firing chamber, and positioning said loaded thermal inkjet head in opposing relation to said surface (See Figure 1 of the reference) of



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**clms 1, 12, 17, 22.** The reference further teaches the target could be paper or polystyrene tubes (read on planar substrate and surface of reagent chamber; See Column 7, lines 55-60; Column 8, lines 14-17), as recited in **clm 9, 10, 15, 16, 20, 21, 26, 27.** The reference teaches the biochemical analytical liquid could be an enzyme, an antibody, etc. (reads on protein and enzyme that are members of a specific binding pair as recited in **clms 7, 8, 24, 25;** See Claim 8 of the reference). In addition, the reference teaches the quantity of liquid ejected through the jet is no more than 2000 picoliters (reads on no more than about 2 or 5 microliter as recited in **clms 1, 4, 12, 13, 17, 18;** See Claim 14 of the reference). The reference also teaches the metered volumes were between 0.23 and 80 nl (reads on “not exceed about 200 picolitres” of **clm 28;** See Column 7, line 24). The reference further teaches a concentration of 0.5 mg/ml (reads on protein of interest is present in said fluid at a concentration that ranges from about 5 to 1000 ug/ml” as recited in **clms 5, 14, 19, 22)** of the enzyme peroxidase was used to deposit in tubes by ink-jet (See Column 7, lines 14-17). Furthermore, the reference teaches washing steps consisting of metering tap water (reads on washing the head following actuating step as recited in **clms 6, 12, 17, 23;** See Example 4, a)-h) of the reference).

Although the ‘688 patent does not explicitly teach the step of “front loading said quantity of fluid into a thermal inkjet head ...”, the claimed thermal inkjet head inherently performs “front loading” process. See MPEP 2112.02:

“Under the principles of inherency, if a prior art device, in its normal and usual operation, would necessarily perform the method claimed, then the method claimed will be considered to be anticipated by the prior art device. When the prior art device is the same as a device described in the specification for carrying out the claimed method, it can be assumed the device will inherently perform the claimed process. In re King, 801 F.2d 1324, 231 USPQ 136 (Fed. Cir. 1986).”

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The device used in the claimed method (or process) is the same as (i.e. a thermal inkjet head printing device) the device of the '688 patent without evidence to the contrary. The instant specification discloses the general characteristics of the "thermal inkjet heads" that are used for the claimed method (see p.6, [0016] of the instant spec.):

"Thermal inkjet heads finding use in the subject methods will generally have the following characteristics. The size of the orifice is sufficient to produce a spot of suitable dimensions on the substrate surface (described in greater detail infra), where the orifice generally has a diameter (or exit diagonal depending on the specific format of the ink jet head) ranging from about 1 to 1000 $\mu$ m, usually from about 5 to 100  $\mu$ m and more usually from about 10 to 60  $\mu$ m. The firing chamber has a volume ranging from about 1 pl to 10 nl, usually from about 10 pl to 5 nl and more usually from about 35 pl to 1.5 nl. The heating element ..."

These "characteristics" are possessed by the "thermal inkjet" described in '688 (e.g. an orifice having drop diameter of 75  $\mu$ m, and a firing chamber with at least 230 pl capacity, as well as a "heating element" for creating the air bubble; see col. 6, lines 60+ and col. 3, lines 30+ of the '688 patent). In addition, the instant specification also discloses that the device (the thermal inkjet) described in the '688 patent is known for "depositing bio/chemical agents such as proteins and nucleic acids" (p. 2, [0005] of the spec.). Furthermore, applicants have stated on record that "the Deeg apparatus may be capable of being front loaded..." (emphasis provided by applicants) in the Reply entered 9/21/06, at p. 8, last para.

The instant specification also discloses "the thermal inkjet device is front loaded with a fluid sample" with the term "the thermal inkjet device" referring to the devices described on p.6, [0016]. Thus, it can be logically concluded that the "thermal inkjet head" of the prior art as described in the instant specification or the inkjet head of the '688 patent, "in its normal and usual operation, would necessarily perform the method claimed".

Furthermore, the term “front loading” is not specifically defined, and is broadly used in the instant specification. For example, the instant specification states the followings:

“In this front loading protocol, the orifice is contacted with fluid under conditions sufficient for fluid to flow through the orifice and into the firing chamber of the head, where fluid flow is due, at least in part, to capillary forces. To assist in the flow of fluid in to the orifice, back pressure in the form of suction (i.e. negative pressure) may be applied to the firing chamber of the head to assist in the flow of fluid to into the orifice” (see [0017] of the specification).

Thus, the only required structural elements from this example of “front loading” described in the instant specification are: contacting the orifice with fluid, flowing the fluid through the orifice to the firing chamber, and the “flowing” is due to “capillary forces” and maybe additional back pressure.

Therefore, from the above description of the “front loading” procedure, it is reasonable to conclude that the “front loading” is mainly through capillary forces. It is known in the art that capillary force is an inherent property of narrow tube to draw a liquid upwards against the force of gravity (see the previously cited definition for “Capillary Action” from Wikipedia.org; 2006; attached to the previous Office action, mailed 7/28/06). Thus the “front loading” capillary action is an inherent property of the inkjet head due to the narrow tube of the nozzle or firing chamber. In other words, whenever the inkjet head orifice, in its normal and usual operation, is in contact with a fluid, the inherent function of capillary suction (or “front loading”) is necessarily performed by the inkjet head.

Furthermore, the instantly claimed “thermal inkjet head” used in printing ink or biological material, “in its normal and usual operation”, would “necessarily perform” back or negative pressure to retain fluid in the nozzle and firing chamber. For example, Cowger et al (US

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5,409,134; 4/25/1995) teaches that “back pressure at the print head must be at all times strong enough for preventing ink leakage” and “a slight back pressure at the print head to prevent ink leakage” in thermal inkjet heads (co. 1 of ‘134). Thus, thermal inkjet heads are known to operate under “back” or “negative” pressure in addition to the capillary force, so that the fluid or ink in contact with the orifice is suctioned in the head before ejection.

In conclusion, all elements of the instant claimed process or method is explicitly or inherently taught by the ‘688 patent as discussed above.

*Discussion and Answer to Argument*

11. Applicant's arguments have been fully considered but they are not persuasive for the following reasons (in addition to reasons of record). Each point of applicant's traversal is addressed below (applicant's arguments are in italic):

*Applicants argue that the Deeg reference does not “disclose the front loading of a fluid into an inkjet head” (Reply, p. 8). Applicants also argue that the Deeg reference does not “inherently” teach “front loading” because the “necessarily perform the method claimed”, “in its normal and usual operation” (Reply, p. 8).*

Each point of Applicant's traversal is addressed by the above discussion under the claim rejection over the Deeg (‘688 patent) reference. Applicants are respectively directed to the above discussion for answer to argument.

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*Applicants also argue that the statement “the Deeg apparatus may be capable of being front loaded ...” by applicants on record “does not in any way take away from the deficiency in Deeg”(Reply, p. 9, para 1).*

As discussed in the body of the rejection, this statement is not the sole reliance from which the rejection is based. Although applicants did not state that the apparatus “is” capable of being front loaded, applicants have not distinctly point out how the “apparatus” taught by Deeg is structurally and/or functionally different from the instantly claimed apparatus.

### ***Double Patenting***

12. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

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13. Claims 1, 2, 9 and 11 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 19-21 and 23 of U.S. Patent No. 6,797,469 B2 (hereinafter referred to as '469 patent). The previous rejection is maintained for the reasons of record advanced on page 7 of the office action mailed on 1/27/06.

Discussion and Answer to Argument

14. Applicant's arguments have been fully considered but they are not persuasive for the following reasons (in addition to reasons of record). Each point of applicant's traversal is addressed below (applicant's arguments are in italic):

*Applicants argue that the amended claims (Claim 1) recites "no more than 5  $\mu$ l", which is not claimed by the '469 patent. (Reply, pp. 9-10).*

Applicants are respectively directed to the rejection set forth in the previous Office action (mailed 1/27/06, p. 7, lines 4-5), where states "The references further teaches the deposited quantity ranges from about 0.1 to 2000 pico liters (see Claim 23)".

15. Claims 1, 2 and 9 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 3, 5-7, 9, 10, 12, 17, and 19 of U.S. Patent No. 6,221,653 B1 (hereinafter referred to as '653 patent). The previous rejection is maintained for the reasons of record advanced on page 7 of the office action mailed on 1/27/06. Because the reference's claim numbers were inadvertently misrepresented, the rejection is rewritten as below.

Although the conflicting claims are not identical, they are not patentably distinct from each other. The '653 patent claims a method for depositing a quantity of fluid containing a

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plurality of binding agents onto a substrate surface (See Claim 19 of the reference). The reference further claims the deposition is through a thermal inkjet (See Claim 1), and applying back pressure to said head during the contacting step (See Claim 7). The reference defines the term "binding agents" as agents such as proteins (Claim 3 and Column 2, lines 29+). The reference also claims the fluid sample does not exceed 200 pico liters in quantity (Claim 19), which reads on the "no more than 5  $\mu$ l" of the instant claims.

Discussion and Answer to Argument

16. Applicant's arguments have been fully considered but they are not persuasive for the following reasons (in addition to reasons of record). Each point of applicant's traversal is addressed below (applicant's arguments are in italic):

*Applicants argue that the amended claims (Claim 1) recites "no more than 5  $\mu$ l", which is not claimed by the '653 patent. (Reply, pp. 9-10).*

Applicants are respectively directed to the above rejection for discussion regarding the "no more than 5  $\mu$ l" limitation.

17. Claims 1, 2, 9 and 11 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 5, 9, 11-13, 15 and 18 of U.S. Patent No. 6,656,740 B1 (hereinafter referred to as '740 patent). The previous rejection is maintained for the reasons of record advanced on pages 7-8 of the office action mailed on 1/27/06.

Discussion and Answer to Argument

18. Applicant's arguments have been fully considered but they are not persuasive for the following reasons (in addition to reasons of record). Each point of applicant's traversal is addressed below (applicant's arguments are in italic):

*Applicants argue that the amended claims (Claim 1) recites "no more than 5  $\mu$ l", which is not claimed by the '740 patent (Reply, p. 10).*

Applicants are respectively directed to the rejection set forth in the previous Office action (mailed 1/27/06, p. 8, para 1), where states "The references further teaches the fluid capacity of the chamber is in the range between 1 pL to 10 nL (See Claim 18)".

19. Claims 1, 2, 6, 7, and 8 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-5, 7 and 11-19 of U.S. Patent No. 6,323,043 B1 (hereinafter referred to as '043 patent) and claims 1, 2, 4 and 6 of its related U.S. Patent No. 6,884,580. The previous rejection is maintained, and is rewritten as below.

For simplicity sake, only the relevant claims from the '043 patent (the parent) are discussed below. Although the conflicting claims are not identical, they are not patentably distinct from each other. The '043 patent recites a method for fabricating an array of biopolymers on a substrate using a biopolymer fluid (would read on protein and enzyme; See Claim 1 and Column 5, lines 63+). The '043 disclosure defines the term "biopolymer" as including peptides or compounds including amino acid (col. 5, lines 60+). The reference further claims the deposition is through a thermal inkjet (See Claim 1 and Column 10, lines 23-35). The reference teaches the load pressure is a negative pressure (Claim 2). The reference also teaches



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the jet head is exposed to cleaning fluid (e.g. Claim 7), which would read on washing the head. The reference patent also defined the term “droplet” (such as used in Claim 1 of ‘043) as “usually less than about 1000 pL”) (col. 6, lines 37), which reads on the fluid quantity recited in the instant Claim 1.

Discussion and Answer to Argument

20. Applicant's arguments have been fully considered but they are not persuasive for the following reasons (in addition to reasons of record). Each point of applicant's traversal is addressed below (applicant's arguments are in italic):

*Applicants argue that the amended claims (Claim 1) recites “no more than 5  $\mu$ l”, which is not claimed by the ‘043 patent (Reply, p. 10). It is noted that applicants did not specifically traverse the rejection over the ‘580 patent.*

Applicants are respectively directed to the above rejection for discussion regarding the limitation of “no more than 5  $\mu$ l”.

21. Claims 1-4 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 3, 8, 12, 14, 15 and 18 of U.S. Patent No. 6,242,266 B1 (hereinafter referred to as ‘266 patent). The previous rejection is maintained for the reasons of record advanced on pages 8-9 of the office action mailed on 1/27/06.

*Discussion and Answer to Argument*

22. Applicant's arguments have been fully considered but they are not persuasive for the following reasons (in addition to reasons of record). Each point of applicant's traversal is addressed below (applicant's arguments are in italic):

*Applicants did not specifically traverse the rejection over the '266 patent. Thus, the rejection is maintained for the reason of record.*

***New Rejections***

***Claim Rejections - 35 USC § 103***

23. Claims 1, 2, 4-10, 12-28, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Caren et al (US 6,221,653; 04/24/2001; cited previously).

Caren et al, teach a method of depositing protein fluid onto arrays using thermal inkjet as discussed supra.

Although Caren et al does not explicitly teach the protein of interest is present in a concentration that ranges from about 5 to 1000 µg/ml as recited in **clms 5, 14, 19, and 22**, it would have been prima facie obvious for one of ordinary skill in the art to have fluids with certain protein concentration for depositing onto an array. Caren et al teach fluid of "binding agents" (DNA) with concentration of 0.1 mg/ml (or 100 µg/ml) (e.g. col. 9, lines 50+). In addition, the reference teaches the method can be used for depositing various "binding agents" such as proteins and enzymes as discussed above. Furthermore, the references teaches that

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concentration of the binding agent can be varied to optimize binding environment (col. 8, lines 15+).

A person of ordinary skill in the art would have been motivated at the time of the invention to use fluid of proteins with certain concentrations (such as 100  $\mu\text{g/ml}$ ), because Caren et al teach the method can be used for depositing fluid containing various "binding agents" such as proteins/enzymes, and the need to optimize binding environment by varying "binding agent" concentration.

A person of ordinary skill in the art would have reasonable expectation of success of achieving such modifications, because the Caren reference teaches various binding agents can be used with the method, and protein fluid concentration is routinely optimized for depositing onto an array using inkjet head.

24. Claims 1, 2, 4-10, 12-28, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Caren et al (US 6,797,469 B2; 09/28/2004; filed 03/26/2001; cited previously).

Although Caren et al does not explicitly teach the protein of interest is present in a concentration that ranges from about 5 to 1000  $\mu\text{g/ml}$  as recited in **clms 5, 14, 19, and 22**, it would have been prima facie obvious for one of ordinary skill in the art to have fluids with certain protein concentration for depositing onto an array. Caren et al teach fluid of "binding agents" (DNA) with concentration of 0.1 mg/ml (or 100  $\mu\text{g/ml}$ ) (e.g. col. 9, lines 50+). In addition, the reference teaches the method can be used for depositing various "binding agents" such as proteins and enzymes as discussed above. Furthermore, the reference teaches that

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A person of ordinary skill in the art would have reasonable expectation of success of achieving such modifications, because the Caren reference teaches various binding agents can be used with the method, and protein fluid concentration is routinely optimized for depositing onto an array using inkjet head.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sue Liu whose telephone number is 571-272-5539. The examiner can normally be reached on M-F 9am-3pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Doug Schultz can be reached at 571-272-0763. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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**JON EPPERSON**  
**PRIMARY EXAMINER**

A handwritten signature in black ink, appearing to be 'J. Epperson', written over the printed name.

SL  
Art Unit 1639  
2/8/2007